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IS 14636 (1998): Flexible Packaging Materials for Packaging of Edible Oils, Ghee and Vanaspati [PCD 21: Plastics Containers]

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खाद्य तेल, घी और वनस्पति की पैकेजबन्दी के लिए नम्य पैक

Indian Standard

FLEXIBLE PACKAGING MATERIALS FOR PACKAGING OF EDIBLE OILS, *GHEE* AND *VANASPATI*

ICS 55.040; 67.200

© BIS 1998

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 1998

Price Group 4

Plastics Containers Sectional Committee, PCD 21

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Plastics Containers Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Plastics have been playing a vital role in the field of flexible packaging. In the form of laminates and multilayer coextruded films, they are expected to dominate the field because of some distinct advantages:

- meeting the exact performance requirements by selection of different layers of the composite structure;
- considerable economy because of lower consumption of raw materials through lower weights;
- retailing in smaller unit packs gives protection from adulteration and convenience to the weaker sections of the society; and
- ease of handling and storage.

The major outlets for such materials are for the packaging of processed and convenience foods, edible oils, *vanaspati* and *ghee*, milk, dehydrated food products, tea and coffee, snack foods, fruit juice concentrates like *Rasna*, petroleum products, etc.

The most commonly used materials as substrates or layers for such applications are LDPE, LLDPE, HDPE, BOPP films, aluminium foil, PET, metallized PET and PP films, etc.

And, for coextruded multilayer films, using the polymers like LDPE, LLDPE, HDPE, PP, EVA, EVOH, barrier resins like Nylon-6, etc.

Flexible packaging materials are used in various other forms such as monolayer films, coextruded films, metallized films of PET, BOPP, laminates, etc.

The flexible material for forming the bag will have to be selected with care. It should have appropriate barrier properties to ensure adequate storage life for edible oils, *ghee* and *vanaspati* without significant change from the initial quality. Further, system must also have physical strength to withstand transportation and transit hazards and must not cause migration into the product, besides desired machineability. The packaging material itself must not deteriorate with passage of time and cause leakage or failure. There can hence be variation in the structure and type of flexible packaging material available (*see* IS 10171 : 1987 Guide on suitability of plastics for food packaging) for manufacturing the edible oils, *ghee* and *vanaspati* pouch.

Performance characteristics will be tested by correlation with type tests (product approval) and acceptance tests (product identification). The packaging material shall be tested for physical characteristics such as construction, thickness, etc, which would be recorded and will be the controlling specification as long as there is no change in the packaging material.

For the food contact applications the standards are being formulated by Plastics Sectional Committee, PCD 12 and the list of standards published so far is given in Annex A for information.

Though the requirement for bond/peel strength is important, it is currently being included in the standard as optional, since adequate data is not available. It shall be incorporated in the later date. However, for the present, the requirement bond/peel strength may be as agreed to between the purchaser and the supplier as determined by the method prescribed in Annex B.

In the preparation of this standard due consideration has been given to the provisions of the *Prevention of Food Adulteration Act*, 1954 and the Rules framed thereunder. This standard is, however, subject to the restrictions imposed under this Act and Rules, wherever applicable.

While preparing this standard considerable assistance has been derived from ASTM F 904 - 91 'Standard Test Method for Comparison of Bond Strength or Ply Adhesion of Similar Laminates Made from Flexible Materials' issued by the American Society for Testing and Materials, USA.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 JULY 2003
TO
IS 14636 : 1998 FLEXIBLE PACKAGING MATERIALS FOR PACKAGING OF EDIBLE OILS, *GHEE* AND *VANASPATI*

(*Foreword, para* 12) — Insert the following new paras after para 12:

'A scheme of labelling environment friendly products with the ECO logo has been introduced at the instance of the Ministry of Environment and Forests (MEF), Government of India. The ECO-Mark is being administered by the Bureau of Indian Standards (BIS) under the *BIS Act*, 1986 as per the Resolutions No. 71 dated 21 February 1991 and No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for marking with the ECO logo, it shall also carry the ISI Mark of the BIS besides meeting additional environment friendly requirements. For this purpose the Standard Mark would be a single mark being a combination of the ISI Mark and the ECO logo.

This amendment is based on the gazette Notification No. 170 dated 18 May 1996 for plastic products as environment friendly products published in the Gazette of the Government of India. This amendment is, therefore, being issued to this standard to include environment friendly requirements for flexible packaging materials for packaging of edible oils, *ghee* and *vanaspati*.'

(*Page* 2, *clause* 5.9) — Insert the following new clause after 5.9 and renumber the subsequent clauses:

'6 ADDITIONAL REQUIREMENTS FOR ECO-MARK

6.1 General Requirements

6.1.1 The product shall conform to the requirements for quality, safety and performance prescribed.

6.1.2 The manufacturer shall produce to BIS the consent clearance as per the provisions of *Water (Prevention & Control of Pollution) Act*, 1974 and *Air (Prevention & Control of Pollution) Act*, 1981 along with the authorization, if required under *Environment (Protection) Act*, 1986 and the Rules made thereunder while applying for the ECO-Mark. The manufacturer shall produce documentary vidence with respect to the compliance of regulation under *Prevention of Food Adulteration Act*, 1954 and *Drugs and Cosmetic Act*, 1940 and Rules made thereunder, wherever necessary.

6.1.3 The product must display a list of critical ingredients in descending order of quantity present expressed as percent of the total. The list of such ingredients shall be identified by Bureau of Indian Standards.

6.1.4 The product packaging shall display in brief the criteria based on which the product has been labelled as 'Environment Friendly'.

6.1.5 The material used for product packaging shall be recyclable or biodegradable.

6.1.6 It shall also suitably mention that ECO-Mark label is applicable only to the packaging material/package, if content is not separately covered under ECO-Mark. It may be stated that ECO-Mark is applicable to the product or packaging material or both.

6.2 Product Specific Requirements

For the manufacture of this product one or more of the virgin material covered in following Indian Standards shall be used:

IS No.	*Title*
10142 : 1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10146 : 1982	Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10151 : 1982	Polyvinylchloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10910 : 1984	Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11434 : 1985	Ionomers resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11704 : 1986	Ethylene/acrylic acid (EAA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12247 : 1988	Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12252: 1987	Polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

(PCD 21)

Reprography Unit, BIS, New Delhi, India

Indian Standard

FLEXIBLE PACKAGING MATERIALS FOR PACKAGING OF EDIBLE OILS, *GHEE* AND *VANASPATI*

1 SCOPE

This standard covers the requirements of flexible packaging materials for the packaging of edible oils, *ghee* and *vanaspati*.

2 NORMATIVE REFERENCES

The following Indian Standards contain provisions which through reference in this text constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1060 (Part 2) : 1960	Method of sampling and test for paper and allied products, Part 2
2508 : 1984	Low density polyethylene films (*second revision*)
2828 : 1964	Glossary of terms used in the plastics industry
4006 (Part 1) : 1985	Methods of test for paper and pulp based packaging materials: Part 1 (*first revision*)
4261 : 1967	Glossary of terms relating to paper and pulp based packaging materials
7019 : 1998	Glossary of terms in plastics and flexible packaging excluding paper (*second revision*)
9845 : 1998	Determination of overall migration of constituents of plastics materials and articles intended to come into contact with foodstuffs — Method of analysis (*second revision*)
14534 : 1998	Guidelines for recycling of plastics

3 TERMINOLOGY

3.1 For the purpose of this standard, definitions given in IS 2828, IS 4261, IS 7019 and the following shall apply.

3.2 Type Test

Tests carried out to prove conformity with the specification. These are intended for product approval of a given type of packaging material.

3.3 Acceptance Test

Tests carried out on sample taken from a lot passing type tests for the purpose of acceptance of the lot on a batch-to-batch basis.

3.4 Lot

In single consignment the flexible packaging material of same type, same form and belonging to the same batch of manufacture grouped together shall constitute a lot.

4 TESTS

4.1 Classification of Tests

4.1.1 *Type Tests*

The following shall constitute type (product approval) tests (*see* Annex C):

a) Material and workmanship (*see* **5.2**);
b) Thickness (*see* **5.3**);
c) Overall migration (*see* **5.4**);
d) Flex test (Gelbo) (*see* **5.5**);
e) Water vapour transmission rate (WVTR) and Oxygen transmission rate (OTR) (*see* **5.6**); and
f) Tensile strength and elongation at break (*see* **5.7**).

4.1.2 *Acceptance Tests*

The following shall constitute the acceptance (product identification) tests:

a) Material and workmanship (*see* **5.2**),
b) Thickness (*see* **5.3**),
c) Overall migration (*see* **5.4**),
d) Flex test (Gelbo) (*see* **5.5**),
e) Tensile strength and elongation at break (*see* **5.7**),
f) Ink adhesion of printed flexible packaging materials (*see* **5.8**), and
g) Product resistance of flexible packaging materials (*see* **5.9**).

4.1.2.1 The batch shall be accepted if the flexible packaging materials are found to comply with requirements of acceptance (product identification) tests given in **4.1.2**.

5 REQUIREMENTS

5.1 The components used for the manufacturing of flexible packaging materials shall be declared and be of food grade quality. The components used shall conform to the relevant Indian Standards published for food contact plastics wherever exists.

5.2 Material and Workmanship

5.2.1 The flexible packaging material shall be uniform in texture and finish. It shall be free from pin holes, streaks, particles of foreign matter, wrinkles and undispersed raw materials. There shall be no visible defects such as holes, tears, blisters or separate layers. The edges shall be free from cuts, nicks and wrinkles.

5.2.2 The flexible packaging materials shall be free from any extraneous odour.

5.3 Thickness

5.3.1 The overall thickness of the material and the thickness of the individual layers of each layer of the flexible packaging material shall be declared by the producer in accordance with the acceptance (product identification) tests.

5.3.1.1 The overall thickness shall be within ±10 percent of the declared value. The overall thickness shall be checked according to method given in A-2 of IS 2508.

5.4 Overall Migration

Representative samples of the flexible packaging materials shall be subjected to Overall Migration Test with *n*-heptane at 27 ± 2°C for 30 minutes according to the method given in IS 9845. The maximum extraction value of the material shall not exceed 10 mg/dm^2 and 60 ppm.

5.5 Flex Test (Gelbo)

Flexible packaging materials shall be subjected to flex test as given in Annex D. These shall then be tested for WVTR and OTR (*see* **5.6**) and the values for these shall not exceed by more than 15 percent on actually determined values in **5.6**.

5.6 Water Vapour Transmission Rate (WVTR) and Oxygen Transmission Rate (OTR)

5.6.1 Flexible packaging materials corresponding to pouches passing the storage tests shall be tested for Water Vapour Transmission Rate (WVTR) according to IS 1060 (Part 2) at 38 ± 1°C and 90 ± 2 percent RH and Oxygen Transmission Rate according to **13** of IS 4006 (Part 1) at 27 ± 1°C and 65 ± 2 percent RH and the values obtained shall be used as controlling specifications for acceptance tests.

5.6.2 The requirements shall be fixed by the manufacturer of flexible packaging material based on **5.6.1**. Samples shall be tested on batch-wise basis and assessed on declared value.

5.7 Tensile Strength and Elongation at Break

5.7.1 Flexible packaging materials shall be tested for tensile strength and elongation at break on 15 mm width according to **A-4** of IS 2508. Values obtained shall be used as controlling specifications for acceptance tests.

5.7.2 The requirements shall be fixed by the manufacturer of flexible packaging materials based on **5.7.1**. Samples shall be tested on batch-wise basis on the values determined above.

5.8 Ink Adhesion of Printed Flexible Packaging Material

The printed matter on the flexible packaging materials when tested in accordance with the method given in Annex E, shall be still legible.

5.9 Product Resistance of Printed Flexible Packaging Materials

The printed matter on the flexible packaging materials when tested in accordance with the method given in Annex F, shall be still legible.

6 PACKING AND MARKING

6.1 The co-extruded film/laminate shall be supplied in rolls overwrapped in plastics film weighing not more than 35 kg, including the mass of the core on which it is wound.

6.1.1 The overwrapped film/laminate for roll shall be marked with the following information:

a) Indication of the source of manufacture,
b) Width of the roll,
c) Mass of the roll,
d) Overall thickness of the co-extruded film/laminate,
e) Batch number and date of manufacture,
f) Components used for the manufacture, and
g) Recycling symbol in line with IS 14534.

6.2 BIS Certification Marking

The flexible packaging materials may also be marked with the Standard Mark.

6.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(Foreword)

LIST OF INDIAN STANDARDS ON PLASTICS SUITABLE FOR USE WITH FOODSTUFFS, PHARMACEUTICALS AND DRINKING WATER

IS No.	*Title*
10142 : 1982	Styrene polymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10146 : 1982	Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10151 : 1982	Polyvinylchloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10910 : 1984	Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11434 : 1985	Ionomers resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11704 : 1986	Ethylene/acrylic acid (EAA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12247 : 1988	Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12252 : 1987	Polyalkylene terephthalates (PET and PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
13576 : 1992	Ethylene methacrylic acid (EMAA) copolymers and terpolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
13601 : 1993	Ethylene vinyl acetate (EVA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

ANNEX B

(Foreword)

BOND/PEEL STRENGTH

B-1 GENERAL

This test method covers a procedure for determination of bond/peel strength or ply adhesion of similar laminates made from flexible materials.

B-2 PRINCIPLE

Ply separation is initially started mechanically by the application of heat or by using a solvent. The separated plies of the test specimen are placed into the grips of a tensile testing machine. The grips are then separated and the force required to further separate the plies is defined as bond strength. Alternatively, the energy may be used.

B-3 APPARATUS

B-3.1 Grips

A gripping system that minimizes both slippage and uneven stress distribution is required. Grips lined with thin rubber, crocus cloth or pressure sensitive tape, as well as file-faced or serrated grips have been successfully used for many materials. Air-actuated grips have been found advantageous particularly in the case of materials that tend to 'neck' in the grips, since pressure is maintained at all times.

B-3.2 Tensile Testing Machine

B-3.3 Specimen Cutter

B-4 REAGENTS AND MATERIALS

B-4.1 Solvents

Toluene, ethyl acetate, MEK (2-Butanone) THF (tetrahydrofuran) or other suitable solvent to weaken the bond between layers sufficiently so that delamination may be started.

> *CAUTION*: Use of these solvents requires that appropriate safeguards be used to avoid hazards of skin contact, inhalation and flammability.

B-5 TEST SPECIMENS AND NUMBER OF SPECIMENS

B-5.1 Test Specimens

Cut strips exactly 25.4 mm wide and about 250 mm long. It is important that the test specimens are cut with clean, uniform edges so as not to affect the test results.

B-5.2 Number of Specimens

5 specimens in the longitudinal (machine) direction. It may be desirable to test specimens in the transverse (cross-machine) direction for special purposes.

B-6 PREPARATION OF APPARATUS AND CALIBRATION

B-6.1 Equip the tensile testing machine according to manufacturer's instructions for testing.

B-6.2 Set full-scale load so that most test specimen scans fall in the centre two-thirds of the chart, and draw speed at 280 mm/min ± 10 percent. A few trial runs may be required. Other draw speeds may be used if it can be shown that they yield the same results as those specified.

B-7 CONDITIONING

B-7.1 Specimen Conditioning

Store specimens at 27 ± 2°C and 65 ± 5 percent relative humidity for not less than 40 h.

B-7.2 End-Use Specimen Conditioning

B-7.2.1 Store specimens at the specific end-use temperature and humidity for not less than 40 h.

B-7.2.2 Accelerated testing conditions for 'wet' materials packaging may be accomplished by placing the test specimens between paper towels saturated with distilled water, sealing in a moisture proof pouch and storing at 27 ± 2°C for 40 h.

B-7.2.3 Conditioning to simulate other conditions of end-use shall be determined by specific application. Normally the conditioning period will be 40 to 96 h.

B-7.2.4 In some cases, conditioning will consist of treatment of test specimen prior to actual conditioning, for example, boilable pouch applications. Test specimens may be immersed in boiling water for a period of time equal to normal end-use and then conditioned for testing as specified in **B-7.1** (or perhaps tested shortly after boiling treatment if desired to simulate performance in use).

NOTE — At these conditions pouch and contents shall be aged to allow time for contents to migrate into seal area.

B-7.3 Test Conditions

Conduct tests in the standard laboratory atmosphere of 27 ± 2°C and 65 ± 5 percent relative humidity.

B-8 PROCEDURE

B-8.1 Initiate separation of the plies of the test specimens mechanically if possible. That is, crinkle roughly or apply adhesive tape to both sides, or both and pull apart if not, initiate the separation by making a heat seal and pulling it apart. If both the above fail, determine which solvent seems best by trial and error and initiate the separation by immersion of the end of the strip in the solvent for as little time as possible to initiate the separation. Heat the solvent solution only if absolutely necessary. Dry well in room air without heat.

B-8.2 Clamp the separated ends of the test specimen in the jaws of the tensile testing machine using an original jaw distance of 25.4 mm and make certain the jaws are aligned vertically.

B-8.3 The unseparated portion of each test specimen shall be treated in one of the following ways:

a) Left loose to move around freely,
b) Supported at 90° to the direction of draw, or
c) Mechanically supported at 90° to the direction of draw.

B-8.4 Activate the tensile testing machine and record the force to separate 76.2 mm of the test specimen at 280 mm/min ± 10 percent. Repeat for each test specimen in the test unit.

B-9 CALCULATION OF RESULTS

B-9.1 Ignore the first 25.4 mm of separation and determine the average force to separate the next 50.8 mm of each test specimen. Express in N/m or g/25.4 mm.

B-9.2 Alternatively, determine the energy to separate the second 50.8 mm of each test specimen. Express in J/m.

ANNEX C

(*Clause* 4.1.1)

PROCEDURE FOR TYPE/PRODUCT APPROVAL

C-1 The flexible packaging material shall be approved if it conforms with the requirements of tests given in **4.1.1**.

C-2 Accordingly, flexible packaging material shall be subjected to overall migration followed by flex test, WVTR and OTR.

C-3 The material successfully passing these type tests shall be tested for physical characteristics like material, construction, thickness which would be recorded and these shall be the controlling specification, as long as there is no change in the flexible packaging materials, as fixed.

C-4 In the event of any change in the flexible packaging materials reapproval will be required and the type tests shall be carried out afresh as in **C-1** to **C-3** and the controlling specifications for acceptance test redetermined and fixed.

C-5 When the proposed changes are such that it may not be expected to significantly affect the performance (satisfactorily passing the type tests), the certifying/testing authority may at its discretion recommend waiving complete reapproval or may require only partial reapproval in order to determine the significance and acceptability of the proposed changes and to redetermine and to fix the controlling specification for acceptance tests.

C-6 If any supplier of flexible packaging materials wishes to obtain product/type approval for material meant for packing a type and quality of edible oils, *ghee* and *vanaspati* having earlier obtained approvals for other types of materials for packing the same type and quality of edible oils, *ghee* and *vanaspati*, he shall file a certificate stating that the product has successfully passed the type tests as stated in **C-1**. The certifying/testing authority may recommend waiving off these type tests or may require only partial approval tests for the purpose of determining the controlling specifications for acceptance tests.

C-7 In the event of material found to be failing one or more type tests, the testing authority may call for fresh samples not exceeding twice the number of original samples and subject them to all the test(s) or the tests in which the failure occurred. The test(s) may be considered to have been satisfied and product approval given only if the repeat test(s) show no failure.

ANNEX D

(*Clause* 5.5)

FLEX DURABILITY OF FLEXIBLE PACKAGING MATERIALS

D-1 PRINCIPLE

Barrier materials are subjected to flexible action consisting of a twisting motion followed by a horizontal motion, thus repeatedly twisting and crushing the film. Increase in gas (oxygen) permeation rate or water vapour transmission rate or both is the criterion for measuring the failure of the flexible barrier materials.

D-2 APPARATUS

D-2.1 Flex Tester

This apparatus shall consist essentially of a 90-mm diameter stationary mandrel a 90-mm diameter movable mandrel spaced at a distance of 180 mm apart from face-to-face at the starting position (that is, maximum distance) of the stroke. Mandrels shall contain vents to prevent pressurization of samples. The specimen supporting shoulders on the mandrels shall be 13 mm wide. The motion of the movable mandrel is controlled by a grooved shaft to which it is attached. For the full of maximum stroke the groove is designed to give a twisting motion of 440° in the first 90 mm of the stroke of the movable mandrel, followed by a straight horizontal motion of 65 mm so that at the closed position the mandrels are 25 mm apart. The motion of the machine is reciprocal with a full cycle consisting of the forward and return strokes. The machine operates at 45 cycles per minute.

D-2.1.1 Figure 1 shows the planar evolution of the helical groove in the driven shaft to give the required 440° (37° helix angle) twisting motion and the straight horizontal motion.

D-2.2 Tape

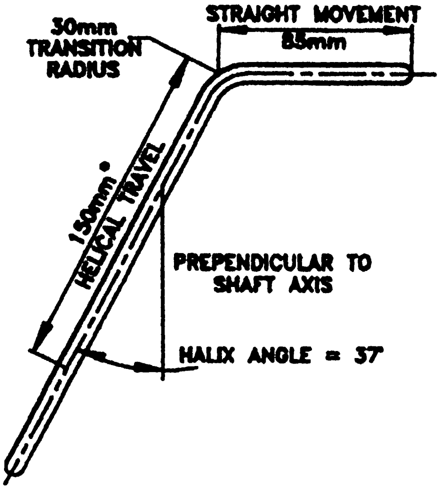
Flexible, double sides, pressure sensitive, not more than 13 mm wide.

D-2.3 Template

For cutting 200 mm × 280 mm samples.

D-3 TEST SPECIMENS

D-3.1 Cut the samples into 200 mm × 280 mm flat sheets with the 200 mm dimension in the direction to



* 150mm HELICAL TRAVEL = 440° ROTATION WITH 90mm SHAFT MOVEMENT

FIG. 1 PLANAR EVOLUTION OF GELBO SHAFT HELICAL GROOVE (31.8 mm DIAMETER SHAFT)

be tested. This will also be in the direction of the flex-tester axis.

D-3.2 Flex test four specimens in their machine direction and four in their transverse direction. In addition, test a control set of four, adjacent, unflexed specimens (either direction) for WVTR and OTR.

D-3.3 Do not seal or tape the sides of the specimens, but leave them open. Use double-sided pressure sensitive tape, not more than 13 mm wide, to attach the unsealed specimen in the shape of a cylinder to the flex-tester mandrels.

D-4 CONDITIONING

Condition the specimens for at least 24 h at 65 ± 5 percent relative humidity and at 27 ± 2°C temperature, unless otherwise specified as agreed upon between the purchaser and the supplier.

D-5 PROCEDURE

D-5.1 Atmospheric Conditions

Conduct flexing at the standard atmospheric conditions of 27 ± 2°C and 65 ± 5 percent relative humidity, unless otherwise specified.

D-5.2 Flex Tester Set-up

Set-up the flex tester for maximum throw and twisting action. This set-up gives a twisting motion of 440° in the first 90 mm of stroke, and is followed by a straight horizontal motion of 65 mm at 45 cycles per minute. With this set-up, space the face of the moving mandrel at a distance of 180 mm from the face of the stationary mandrel when the moving mandrel is at its starting position. In the closest position the moving mandrel is 25 mm from the stationary mandrel.

D-5.3 Flexing

Attach the flexible barrier specimen to the flex-tester mandrels, which have been lined with double sided pressure sensitive tape. Turn the flex tester on, and allow the specimen to flex for 6 minutes at 45 cycles per minute (that is, 270 cycles).

D-5.4 After the flex test subject the test specimen to Water Vapour Transmission Rate (WVTR) and Oxygen Transmission Rate (OTR) (*see* 5.6) and note the increase in values of WVTR and OTR.

ANNEX E

(*Clause* 5.8)

TEST FOR INK ADHESION OF PRINTED FLEXIBLE PACKAGING MATERIALS

E-1 Apply two strips of 25 mm wide transparent pressure sensitive tapes or cello-tape to the printed area of the flexible packaging materials, one piece down the length of the flexible packaging materials and the other along the width.

E-2 Press the tape firmly on to the flexible packaging materials and leave for 15 seconds.

E-3 Remove the tape by pulling slowly at about 10 mm/s from one end at about 90° to the flexible packaging materials surface.

E-4 There shall be no significant removal of the print from the surface of the flexible packaging materials and the printed material shall be still legible.

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6.1 General Requirements

6.1.1 The product shall conform to the requirements for quality, safety and performance prescribed.

6.1.2 The manufacturer shall produce to BIS the consent clearance as per the provisions of *Water (Prevention & Control of Pollution) Act*, 1974 and *Air (Prevention & Control of Pollution) Act*, 1981 along with the authorization, if required under *Environment (Protection) Act*, 1986 and the Rules made thereunder while applying for the ECO-Mark. The manufacturer shall produce documentary vidence with respect to the compliance of regulation under *Prevention of Food Adulteration Act*, 1954 and *Drugs and Cosmetic Act*, 1940 and Rules made thereunder, wherever necessary.

6.1.3 The product must display a list of critical ingredients in descending order of quantity present expressed as percent of the total. The list of such ingredients shall be identified by Bureau of Indian Standards.

6.1.4 The product packaging shall display in brief the criteria based on which the product has been labelled as 'Environment Friendly'.

6.1.5 The material used for product packaging shall be recyclable or biodegradable.

6.1.6 It shall also suitably mention that ECO-Mark label is applicable only to the packaging material/package, if content is not separately covered under ECO-Mark. It may be stated that ECO-Mark is applicable to the product or packaging material or both.

6.2 Product Specific Requirements

For the manufacture of this product one or more of the virgin material covered in following Indian Standards shall be used:

IS No.	*Title*
10142 : 1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10146 : 1982	Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10151 : 1982	Polyvinylchloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10910 : 1984	Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11434 : 1985	Ionomers resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11704 : 1986	Ethylene/acrylic acid (EAA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12247 : 1988	Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12252: 1987	Polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

(PCD 21)

ANNEX F

(*Clause* 5.9)

TEST FOR PRODUCT RESISTANCE OF PRINTED FLEXIBLE PACKAGING MATERIALS

F-1 Leave the flexible packaging material to stand for at least 24 h after printing.

F-2 Take a representative section of the printed area, of the flexible packaging material and smear it with the edible oils, *ghee or vanaspati* intended to be packed into it and leave it for 1 h.

F-3 Rub each flexible packaging material or representative section firmly with paper tissue 10 times.

F-4 There shall be no significant removal of the print from the surface of the flexible packaging material and the printed material shall be still legible.

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Amendments Issued Since Publication

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